

Nutrient Management in Irrigated Pacific Northwest Wine Grapes

ARS LOCATION:

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PRINCIPAL INVESTIGATOR:

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PROJECT OBJECTIVES:

1. Increase understanding of economically and environmentally sustainable nutrient management for irrigated wine and juice grapes.
2. Develop tissue nutrient guides for irrigated Pacific Northwest vineyards.

MAJOR ACCOMPLISHMENTS (2007–2010):

Nitrogen Management in Juice Grapes:

The research trial evaluating legume cover crops as an N source in Concord grape was completed in 2006, with the thesis and defense by graduate student Kyle Bair. One manuscript has been published and one is in press (Project funded by the Northwest Center for Small Fruits Research).

Additional research evaluating N rates and timing in drip irrigated Concords has clearly shown that late season (post harvest) fall applications of N are ineffective in supplying N to Concords. This research also indicated that applications of 0 and 22 kg/ha of N per season is insufficient to support Concord production (Project funded by the Washington State Concord Grape Research Council).

Tissue Nutrient Standards for Inland Pacific Northwest Grapes:

Several different research projects were conducted to develop tissue nutrient standards for inland Pacific Northwest grapes under irrigated systems. Research on N rates was conducted using Merlot and Riesling for five growing season (funded by the Washington Wine Advisory Committee). Wine grape leaf blade and petiole samples were collected throughout the inland irrigated areas of WA, OR, and ID from eight different varieties of wine grapes (funded by NW center for Small Fruit Research). Finally, whole Concord grapes were excavated at seven different growth stages for two growing seasons and analyzed for complete nutrients to determine nutrient uptake and repartitioning (funded by the Washington State Concord Grape Research Council). The information from these studies was used to develop tissue nutrient guides for the inland, irrigated Pacific Northwest.

TECHNOLOGY TRANSFER/OUTREACH:

Extension/Outreach (Invited Presentations): 1997–2009

- November 19, 2009: Winegrape tissue nutrient standards for the irrigated Pacific Northwest. Washington State Grape Society, Grandview, WA.
- July 28, 2009: Research advances in wine and juice grape: field and pot studies Washington State Grape Society Summer Field Day, Prosser, WA.
- November 20, 2008: Nitrogen management and grape quality. Washington State Grape Society, Grandview, WA.

- June 30, 2008: Avoiding common mistakes in the winery. Western Washington Wine Workshop, Mt. Vernon.
- April 22, 2008: It is a Disease or is it a Disorder? Grape Disease Workshop, Prosser, WA.
- April 12, 2008: Soils for producing premium grapes. Vines to Wine Workshop, Prosser WA.
- April 12, 2008: Soil and tissue testing for new and established vineyards. Vines to Wine Workshop, Prosser WA.
- February 20, 2009: Nutrient uptake in Concord grape. National Grape local grower meetings. Two meetings, Wapato, WA and Grandview, WA.
- February 7, 2008: Soil sampling and testing. WAWGG Annual Meeting, Kennewick, WA.
- December 11, 2007: Soil and tissue testing does and don'ts for vineyards and orchards. Far West Fertilizer Annual Conference, Kennewick, WA.
- December 6, 2007: Concord grape mineral nutrient distribution, Part Two: Micronutrients. Grape fieldmen's breakfast, Prosser, WA.
- November 14, 2007: Concord whole plant C-N-P-K Budget. Washington State Grape Society Annual Meeting, Grandview, WA.
- November 1, 2007: Concord grape mineral nutrient distribution, Part One: Ca, Mg, S. Grape fieldmen's breakfast, Prosser, WA.
- October 31, 2007: Soil moisture distribution in drip irrigated vineyards. Wine Tourism- Georgia (the country). Prosser, WA.
- September 22, 2007: Wine judging: Are the judges really blind? Harvest School, Wenatchee, WA.
- February 21, 2007: Nutrition for Concord Grape Vineyards. National Grape Local Area Growers Meetings (Three meetings, held in two locations [Wapato, Grandview], over 21 and 22 February).
- February 20, 2007: Nutrient variability in vineyards and orchards. InfoAg Northwest, Kennewick, WA.
- February 20, 2007: Sensors for in-season N management. InfoAg Northwest, Kennewick, WA.

EXTERNAL SUPPORT:

- Northwest Center for Small Fruits Research
- Washington State Concord Grape Research Council
- Washington Wine Advisory Board

COLLABORATORS:

Dr. Markus Keller and Dr. Robert Stevens (emeritus), Washington State University, Prosser, WA; and Dr. Donald Horneck, Oregon State University, Hermiston, OR.

RECENT PUBLICATIONS:

- Bair, K.E., J.R. Davenport, and R.G. Stevens. 2008. Release of available nitrogen after incorporation of a legume cover crop in Concord grape. HortScience 43: 875-880.
- Davenport, J.R., K.E. Bair, and R.G. Stevens. The Relationship Between Soil Temperature and N Release in Organic and Conventionally Managed Vineyards. Commun. Soil Sci. Plant Anal.: In Press.

- Davenport, Joan R., and Donald A. Horneck. Sampling Guide and Nutrient Assessments for Irrigated Vineyards of the Inland Pacific Northwest. Pacific Northwest Extension Bulletin: In Press
- Davenport, J.R., M.Keller, and L.J. Mills. 2008. How cold can you go? Frost and winter protection for grape. HortScience 43: 1966-1969.
- Davenport, J.R., J.D. Lunden, and T. Winkler. Wine Grape Tissue Nutrient Concentrations in the Inland Pacific Northwest. Commun. Soil Sci Plant Anal.: In Press.
- Davenport, J.R., R.G. Stevens, and K.M. Whitley. 2008. Spatial and temporal distribution of soil moisture in drip irrigated vineyards. HortScience 43:229-235
- Perry, E.M., F.J. Pierce, J.R. Davenport, and J. Smithyman. 2009. Comparing active optical and airborne measurements of grape canopies. Acta Hort. 824:75-84 http://www.actahort.org/books/824/824_8.htm
- Pradubsuk, S., and J.R. Davenport. Seasonal uptake and partitioning of macronutrients in mature 'Concord' grape. J. Amer. Soc. Hort. Sci.: In Press.